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09/643,298	08/22/2000	Toru Fujita	04783.015001	8371

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EXAMINER

LEE, TOMMY D

ART UNIT	PAPER NUMBER
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2624

DATE MAILED: 03/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/643,298

Applicant(s)

FUJITA, TORU

Examiner

Thomas D. Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 8-13 is/are rejected.
- 7) ☒ Claim(s) 6 and 7 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 6 and 7.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Applicant's abstract currently exceeds 150 words.

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is

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requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 4, 5 and 8/4 (claim 8 as depending from claim 4) are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 recites, "An image processor according to claim 1, wherein the conversion *table* is composed of ..." (italics added). Three conversion tables are recited in claim 1, and thus the claims do not make clear which conversion table claim 4 is referring to. Claims 5 and 8 depend from claim 4 and are thus indefinite for the same reasons.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-3, 8/(1-3, 6) and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,172,767 (Takemoto) in view of U.S. Patent 5,542,031 (Douglass et al.).

Regarding claims 1-3, Takemoto teaches an image processor comprising: conversion table storing means for storing a plurality of conversion tables to determine a correspondence relationship between image reproduction data, including development area information, and tone data (threshold matrices (Figs. 4(a)-4(d)) stored in ROM 22 (column 5, lines 15-17)); halftone processing means for receiving the tone data of respective colors and then finding, for each color, the image reproduction data at each dot by referring to one of the conversion tables (input image information binarized by comparison against threshold matrix (column 5, lines 15-17)); and image reproducing engine for reproducing images by receiving the image reproduction data at each dot for each color and by determining a development area at the dot on the basis of the development area information included in the image reproduction data (image formed by laser exposure device 13 based on binarized input image information (column 5, lines 17-19)); wherein the conversion table storing means stores: at least two conversion tables A and B where the correspondence relationship is determined in such a manner that halftone spots are formed in lines and screen angles are perpendicular to each other (first gradation pattern for first color grows linearly in direction corresponding to a first screen angle (column 5, lines 35-38), second gradation pattern for second color grows linearly in direction corresponding to a second screen angle different from the first screen angle by 90 degrees (column 5, lines 39-44)). The image reproduction data further includes development area location information (information corresponding to location of threshold values within matrices), and the image reproduction engine determines a development area at the dot on the basis of the development area

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information and the development area location information included in the image

reproduction data (development area determined on the basis of input image

information and locations of threshold values (column 5, line 58 – column 6, line 33)).

The development area information is a beam irradiation area and the development area

location information is a beam irradiation location in a beam scan direction within the dot

and the image reproducing engine attaches toner by irradiating a beam in a developing

area (laser beam irradiates surface of photoreceptor 11 in response to image

information and threshold values in matrices (column 4, lines 37-44; column 5, line 58 –

column 6, line 25), toner supplied from developing device 14 (column 4, lines 44-47)).

Takemoto further teaches at least one conversion table C (gradation pattern

images for third and fourth colors formed (column 5, lines 45-54)). However, the

correspondence relationship does not appear to be determined in such a manner that

angle differences between a screen angle determined by the conversion table C and the

screen angles determined by the two conversion tables A and B become irrational

tangent angles (screen angles third and fourth pattern images different from first and

second screen angles by 20 degrees or more (column 5, lines 45-54). While 20

degrees is an irrational tangent angle, Takemoto's disclosure appears to point to screen

angles of pattern images differing by *rational* tangent angles greater than 20 degrees.

(column 6, line 58 – column 8, line 65; note that values "a" and "b" in each of the tables

1-8 are all rational numbers, thereby producing rational tangent angles for " Θ ").

Douglass et al. teach a halftone computer imager using halftone screen for each of four different colors, the screen angles being set at 15, 45, 75 and 105 degrees

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(column 6, lines 56-60). Thus two screen angles (15 and 105 degrees) are perpendicular to each other, while a third screen is set such that the angle difference between the third screen angle (75 degrees) and the screen angles determined by the other two screens are 60 degrees ($75 - 15$) and 30 degrees ($105 - 75$), which are irrational tangent angles. Douglass et al. state that by setting the halftone screens at the above screen angles, a rosette pattern is formed of circular patterns, which are preferred as they are not as distracting to the human eye as are other pattern geometries (column 6, line 61 – column 7, line 2). Douglass et al. also noted that in the past, precomputerized printing processes had observed that screens located with 30 degree offsets between colors are preferable (column 2, lines 23-26). Therefore, it would have been obvious for one of ordinary skill in the art to modify the teaching of Takemoto (rational tangent angles greater than 20 degrees) by offsetting screen angles by irrational tangent angles of 30 degrees, as taught by Douglass et al.

Regarding claim 8, both Takemoto (image forming unit 10, note Fig. 1) and Douglass et al. (printer 34, note Fig. 2) provide a printing system comprising image processors as described above, and thus it would have been obvious for one of ordinary skill in the art to provide the combined image processor of Takemoto and Douglass et al. in a printer system as well.

Regarding claims 9 and 10, Takemoto et al. teach an image processing method comprising the steps of: storing, in a storing means, conversion tables to determine a correspondence relationship between image reproduction data, including development area information, and tone data (threshold matrices (Figs. 4(a)-4(d)) stored in ROM 22

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(column 5, lines 15-17)), the conversion tables including: at least two conversion tables A and B where the correspondence relationship is determined in such a manner that halftone spots are formed in lines and screen angles are perpendicular to each other (first gradation pattern for first color grows linearly in direction corresponding to a first screen angle (column 5, lines 35-38), second gradation pattern for second color grows linearly in direction corresponding to a second screen angle different from the first screen angle by 90 degrees (column 5, lines 39-44)); finding for each of plural colors the image reproducing data at each dot from the tone data at each dot by referring to one of the conversion tables (input image information binarized by comparison against threshold matrix (column 5, lines 15-17)); and determining a development area at the dot on the basis of the development area information included in the image reproduction data at the dot, thereby reproducing images (image formed by laser exposure device 13 based on binarized input image information (column 5, lines 17-19)). The image reproduction data further includes development area location information (information corresponding to location of threshold values within matrices), and a development area at the dot is determined on the basis of the development area information and the development area location information (development area determined on the basis of input image information and locations of threshold values (column 5, line 58 – column 6, line 33)).

Takemoto further teaches at least one conversion table C (gradation pattern images for third and fourth colors formed (column 5, lines 45-54)). However, as mentioned above, the correspondence relationship does not appear to be determined in

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such a manner that angle differences between a screen angle determined by the conversion table C and the screen angles determined by the two conversion tables A and B become irrational tangent angles (screen angles third and fourth pattern images different from first and second screen angles by 20 degrees or more (column 5, lines 45-54). While 20 degrees is an irrational tangent angle, Takemoto's disclosure appears to point to screen angles of pattern images differing by *rational* tangent angles greater than 20 degrees. (column 6, line 58 – column 8, line 65; note that values "a" and "b" in each of the tables 1-8 are all rational numbers, thereby producing rational tangent angles for " Θ ").

Douglass et al., as mentioned above, teach a halftone computer imager using halftone screen for each of four different colors, the screen angles being set at 15, 45, 75 and 105 degrees (column 6, lines 56-60). Thus two screen angles (15 and 105 degrees) are perpendicular to each other, while a third screen is set such that the angle difference between the third screen angle (75 degrees) and the screen angles determined by the other two screens are 60 degrees (75 – 15) and 30 degrees (105 – 75), which are irrational tangent angles. Douglass et al. state that by setting the halftone screens at the above screen angles, a rosette pattern is formed of circular patterns, which are preferred as they are not as distracting to the human eye as are other pattern geometries (column 6, line 61 – column 7, line 2). Douglass et al. also noted that in the past, precomputerized printing processes had observed that screens located with 30 degree offsets between colors are preferable (column 2, lines 23-26). Therefore, it would have been obvious for one of ordinary skill in the art to modify the

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teaching of Takemoto (rational tangent angles greater than 20 degrees) by offsetting screen angles by irrational tangent angles of 30 degrees, as taught by Douglass et al.

Regarding claims 11-13, these claims recite the method steps of above-rejected claims 9 and 10, stored as an image processing program recorded in a record medium. While not explicitly stated in Takemoto or Douglass et al., it has been well established in the art to provide computer software for performing image processing steps in general, and it would have been obvious for one of ordinary skill in the art to provide such software for performing the steps of the combined teaching of Takemoto and Douglass et al. on a computer without the need for specific image processing hardware.

Allowable Subject Matter

8. Claims 6 and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Claims 4 and 5 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter: No prior art has been found to teach or suggest the conversion tables of claim 1 composed of a gamma table determining a relationship between tone data and development area information, and an index matrix with an identifier specifying the gamma table located at a corresponding position on the matrix, as recited in claim 4; or screen angles of conversion tables A and C adding up to approximately + or - 90

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degrees and their difference as an irrational tangent between 30 and 40 degrees, as recited in claim 6; or a conversion table D whose screen angle is perpendicular to the screen angle of conversion table C, as recited in claim 7.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas D. Lee whose telephone number is (703) 305-4870. The examiner can normally be reached on Monday-Friday (7:30-5:00), alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on (703) 308-7452. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Thomas D. Lee
Primary Examiner
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tdl
March 5, 2004